



# Memo

**To** Dina Mackin – California Public Utility Commission  
**From** Jim Kelsey, President – kW Engineering  
**CC** Margie Gardner, CEEIC  
**Date** May 28, 2015  
**Re** Response to Commission Staff Request for Comments on Baseline Issues

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We at kW Engineering appreciate the opportunity to provide input to the CPUC on the important topic of energy efficiency baselines. Thank you for requesting our feedback and for your attention to our comments on this important issue.

kW Engineering provides consulting engineering services in the areas of energy efficiency and renewable energy to its customers. Our staff of over 50 specialize in high-energy use buildings in the commercial and industrial markets. Our clients include private commercial and industrial businesses, city, county and state agencies, school districts, investor-owned and municipal utilities.

We would also like to offer our support of comments submitted today from the California Energy Efficiency Industry Council.

## **Baseline Discussion – General Comments**

kW Engineering offers the following general comments:

- In the April 28<sup>th</sup> workshop Commission Staff used a Venn diagram to represent the potential for overlap between naturally occurring savings and Codes & Standards (including ISP). The diagram is helpful for visualizing potential overlap but misses the important element of time as it relates to adoption of to-code and ISP in existing buildings. To-code and industry standard practice take many years to turnover in existing building stock. In fact since new construction projects in commercial buildings take several years to complete, often newly completed buildings would not meet the current code shortly after occupancy. This slow turnover ensures that at any given time, much of the building stock is far below current code. The actual pace of “naturally occurring” is thus very slow.
- Bringing existing buildings up to current codes, rather than the code that was in place when the building was constructed, should constitute a program victory. If CPUC policy is defined in such a way as to give no program credit for energy efficiency improvements in existing buildings to motivate building owners to bring buildings up to current codes, this definition will

create a large gap in the potential savings between naturally occurring and C&S/ISP savings. There is a huge difference between current code and standard practice in existing facilities in terms of equipment efficiencies, controls, and operations. Most existing commercial buildings that have been operating for a few years would not meet code for the year they were constructed, let alone the current high bar set by T-24, 2013.

- Commission staff understandably request data to support our conclusions about existing building stock. This data is hard to come by – to date there has been little incentive for program implementers to collect it. In particular, collectively we should seek information to examine the following areas:
  - Determine the current state of the industry in terms of code compliance and operations and maintenance (O&M) practice.
  - Determine equipment useful lifetime in actual practice, rather than using assumptions built into DEER.
- Our experience and observation is that the difference between the observed existing building stock and code-compliant, well repaired facilities is very great. For example, PIER research suggests that economizers in 63% of the buildings in CA are non-functional, and almost half of all rooftop units have improper refrigerant charge<sup>1</sup>. We understand the CPUC's reluctance to provide ratepayer incentives to perform basic maintenance. However, to use this logic to turn energy efficiency program attention away from O&M practice, as if this practice were exemplary, is to ignore the reality of building stock and operational performance. It is a current major market failure that building operators do not properly value the impact of poor maintenance on building performance. If we choose to systematically ignore this problem, we are failing the ratepayers by not seeking cost-effective energy savings where we know they occur. CPUC policy needs to address market failures where they occur, including O&M market failures on the same level as failures to purchase higher efficiency equipment, failures to adopt new technologies, or failures to apply better controls. Current policy seems more preoccupied with preventing "gaming" than addressing real issues.
- Rather than relying on program implementers to gather this data, we recommend that the CPUC and CEC fund research that makes this data available. The emphasis of program implementation teams has been directed toward cost effective energy efficiency resource acquisition, not baseline data acquisition.

## **Retrofit Add-on (REA) Guidance Document**

Commission staff (Katie Wu) issued a memo April 20, 2015 with the subject: "Commission staff responses to IOU comments on draft updates to Retrofit Add on Guidance Document." While not strictly part of the Baseline Workshop agenda, the proposed decision in that memo is relevant to the overall baseline discussion.

- The document appears to effectively eliminate any "to-code" savings in existing buildings. Adoption of this policy would eliminate incentives and program credit for any measures except those that exceed the high standard set by Title 24. T-24 is designed as a new construction standard and is an inappropriately high bar for projects where "do nothing" is a

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<sup>1</sup> Public Interest Energy Research Program Technical Brief, Public Interest Energy Research Program Technical Brief, <http://www.energy.ca.gov/2005publications/CEC-500-2005-046/CEC-500-2005-046-FS.PDF>.

viable option. Interpretation of this standard as written would appear to “zero out” any potential program savings or incentives from projects that are program-induced. Implementation of this policy as written would create a “catch 22” whereby any proposed REA project to bring existing buildings to the high standard set by 2013 code would yield no savings.

- We propose that for REA measures where “do nothing” or replacing like-with-like is a viable and code-compliant alternative, the dual baseline methodology be used. For example, in an existing building with constant speed pumping, adding a VFD to vary the flow in the system would use the existing system as the baseline for the RUL and T-24 be used as the baseline beyond the remaining life of the existing equipment.
- The guidance document is unclear on a number of issues including the breadth of interpretation and potential complications around the attribution of savings to existing building programs and C&S programs. Specifically examples are needed to clarify discussion points for common measures, including retrofit add-on and RCx examples.
- Included in the needed clarifications is to explicitly state that when a facility is in compliance with the code that was enforced when it was constructed (i.e. the building is in code compliance), adding REA efficiency measures or controls that bring the building up to the present (2013) version of the code is a project that merits ratepayer incentives and credit towards program goals. Program induced savings of this type are neither naturally occurring, nor ISP, nor required code upgrades.
- We agree with comments provided by SCE and SDG&E pertaining to ARA, especially in terms of:
  - the need for public discussion of these baseline issues
  - potential for unclear interpretation,
  - potential to add delay and complications due to ISP development,
  - increased transaction costs, and poorer customer experience.
- We are concerned about the potential implications of April 20 memo guidance, especially with respect to RCx, MBCx, whole-building and behavioral programs. These program yield very cost-effective energy savings in existing buildings by improving operational approaches, and capitalize on the fact that most buildings are operated in a manner in which they perform far below current (2013) code.
- We are further concerned that the interpretation of this document will cause cost effective energy efficiency potential savings to be “left on the table”. There is a huge potential of energy efficiency savings in the state that lie between current Industry Standard Practice for O&M, and a Title 24 code-compliant building. Walking away from those very real energy savings is not in the best interests of the state’s ratepayers, and does not help us achieve the savings and emissions goals that we need to meet AB32, recent governor’s directives, or the CPUC’s goals.

## **Retrofit Add-on (REA) Retro-commissioning (RCx) Specific Comments**

The guidance document has particular impact on approaches specific to RCx and monitoring-based commissioning (MBCx) program approaches. For those program-types in particular we would like to highlight the following:

- The guidance document uses the terminology and approach for retro-commissioning measures that is an awkward adaptation of the definitions used in retrofit scenarios. RCx and MBCx project measures are distinctly different and merit consideration within their own framework. RCx is not a subset of a retrofit approach – it addresses operational and market failures that are distinctly different from typical retrofit projects.
- We are concerned that, if this guidance is interpreted in a way that removes the majority of RCx measures from any available incentives, this policy could cause administrators to discontinue RCx programs – stranding a huge potential for cost effective energy savings across the state. Note that the statewide potential studies that were used to set EE goals for the state included RCx measures and programs explicitly.
- It has been asserted by Commission staff and consultants in baseline discussions that incentives for improved O&M practices, or that cover some repairs, would somehow motivate customers to adopt poorer practice or depend on “subsidized O&M”. We don’t believe that this is the case – and that program rules can be developed to ensure that poor practice isn’t rewarded.

## **Specific Recommendations – Ways Forward**

With respect to the above information, we make the following specific recommendations for path’s forward:

- The CPUC should fund a market assessment study to determine industry standard practice with respect to operations and maintenance practices in existing buildings. Current policies are based on assumptions with respect to equipment and turnover, lifetimes, and code compliance that are contradictory to the experience of professionals who work in the field on a daily basis. The gap between those assumptions and actual practice needs to be documented so that programs can address market failures where they occur.
- A separate framework should be created for addressing baselines in RCx and MBCx programs based on actual market conditions.
- The CPUC can help address O&M market failures by adopting policies that allow programs and customers to be incentivized by improving operations and maintenance practices above actual current practice, rather than only recognizing savings above current code.
- Baseline policies should be developed with an eye towards communicating them to program customers, not only program administrators and implementers. Policies that are difficult to communicate to end customers have little chance of successful implementation.

## Responses to Specific Questions from Commission Staff

1. The measure characterization list presented by CPUC staff— and included in the CPUC white paper presentation—identifies the measures that will be covered in the Baseline Analysis, and how they should be characterized. This is intended as a starting point for discussion analysis rather than a decision on baseline.

Is the measure characterization list complete, or are there additional types of measures that may have uncaptured energy efficiency savings below code or ISP? Are they characterized accurately? What changes do you propose?

Using measures as illustrative examples is a good step towards communicating policy clearly. However, focusing the main discussion around measures works against one of the stated goals of the CPUC – to seek better integrated DSM solutions, and holistic approach to buildings, rather than a piecemeal measure-by-measure approach. We suggest that, in addition to this measure-based approach to the discussion the Commission continue to set policy that can be interpreted broadly, including approaches that differ from the current measure-based framework.

For example, one of the most innovative, cost-effective, and customer-friendly approaches that have been developed in the last two years are whole-building programs, where whole-building M&V is used to demonstrate savings. This program approach focuses attention on the “bottom line” of energy savings, which emphasizes the bottom-line savings that the state, and the end-use customer needs, rather than spending excessive effort determining the attribution of savings among measures, and the attribution between C&S savings vs. retrofit programmatic savings. This whole-building approach does not fit in the measure-by-measure characterization of the baseline issue at all, so adopting the measure-by-measure approach may effectively eliminate the whole-building approach from consideration.

The measure characterization listed by the CPUC is actually a mix of end-use categories and measures and does not capture the full breadth of energy efficiency measures in the C&I market. Extensive measure characterization schema have been developed by the IOUs – these would make a good foundation than developing a new measure list for review. kW Engineering has a list of over 250 basic measures for the commercial market alone.

2. In your professional experience, what are the types of actions in the market place that lead to buildings/energy end uses failing to meet code or be upgraded to ISP, and what measures do not get adopted because of this? Please be specific and comprehensive, listing out all types of activities and correlated measures that you are aware of. Please identify the types of building that these experiences apply to, i.e., Class A, B or C commercial; public or private buildings, types of commercial activity, vintage of buildings etc. For instance, what ways do contractors act to avoid “triggering code”?

In the commercial real estate market, most buildings meet code for the year in which they are permitted. To characterize not updating those buildings to current code or ISP as a “failure” is to re-prioritize the responsibilities of the people in charge of running those buildings. The goal of most building maintenance staff members is not to improve the performance of the building to its optimal level – it is to keep buildings safely operating and minimize the complaints of the occupants. Over the last decade we have seen a steady trend in the industry of fewer staff members responsible for larger building portfolios. This trend leads to priorities that set a hierarchy of service where minimum basic service is the highest priority leaving energy efficiency lower on the list.

3. What specific information/data can you provide on the volume of deferred retrofits and retrofits that avoided code triggers or code compliance? In what types of buildings (as clarified above)? What evidence is there that these cases reflect norms of market activity rather than the exception?

We cannot provide specific data on these trends at this time. We hope that Commission staff, in the absence of this data, recognize some validity in the input of multiple stakeholders that report experience similar to what we have noted above.

4. How do the Commission and CEC's assumptions about the rate of turnover compare with your observations of the market? Please be comprehensive and specific (like above). What evidence/ data can you provide?

Our field experience is that, for many common equipment types in the commercial and industrial sectors, the turnover of new equipment is much slower than EUL's used by DEER. There are several reasons for this. First, many building owners do not properly value the cost savings associated with preventative maintenance and early retirement of equipment. This is especially true in the small and medium commercial markets where most buildings are not maintained daily by onsite staff – they are typically fixed by outside contractors when they fail. Few small or medium commercial facilities have any plan for regular equipment replacement. Secondly, even in large commercial facilities, equipment may run longer than stated equipment lifetimes and site staff have no motivation to retire them early. In most buildings, the staff responsible for maintaining equipment do not even have visibility to the energy costs of running those facilities because the functions of servicing equipment and paying energy bills are separated in different departments, budgets, and sometimes even done in different states. Finally, the DEER equipment categories represent an over simplification of the customized equipment that we see in the field. In large commercial buildings HVAC systems are comprised of many components that do not have to be replaced at the same time. For example, an energy management system (EMS) is listed as a single component with an EUL of 15 years. In fact this system is built of many smaller systems including sensors, programmable logic controllers, gateways, networking components, central processing unit, etc. These components are typically replaced piecemeal as they fail, rather than as part of a comprehensive project. So a given system life may be extended well beyond 15 years. Given the high price of replacing these systems, owners will always look for lower cost options to extend the lifetime if possible.

5. Equipment does burn out, and buildings do get retrofit, triggering code upgrades. Given this reality, coupled with the fact that federal and state Codes and Standards exist and set efficiency floors for replacement equipment and building renovations, how can the CPUC ensure that an existing conditions baseline will not provide customers incentives and credit utility programs for large amounts of savings that are already occurring anyway?

In the commercial market, the current method for evaluation and measurement of savings emphasizes project-by-project and measure-by-measure review of free ridership. This system, especially with the relatively recent addition of the ex-ante custom review process, is extremely inefficient in terms of technical resources, and leads to a customer experience that discourages customers from involvement with energy efficiency programs for any measures beyond standard replacement projects. Custom projects represent a large potential for energy savings and are gradually being de-emphasized by utilities as this system has gotten increasingly cumbersome and unpredictable.

The current system of project-by-project and measure-by-measure review could be replaced by the adoption of market studies to establish baseline practices for participants and non-participants as a separate research activity. In this way, the activities of determining typical practice and rates for

natural adoption could be separated from the administration of programs, and the research burden placed on research activities and professionals, rather than on program implementers and program participants as is currently the case. The current system inappropriately places the burden of determining free ridership (and inherently natural adoption rates) on those who are also responsible for encouraging program participation. This situation establishes an inherent conflict of interest that cannot be resolved by adding project-by-project review.

The question combines two concepts that must be separated – those of customer incentives and IOU savings credit; “, [how can the CPUC ensure that an existing conditions baseline will not provide customers incentives and credit utility programs for large amounts of savings that are already occurring anyway](#)”. We agree that utility programs should not be credited for naturally occurring C&S savings. To assess this credit on a project-by-project basis is untenable and inefficient from an overall basis. If sufficient data existed on a sector-by-sector adoption rates for participants and non-participants, these naturally occurring savings could be “netted-out” on an overall basis. However, it is beyond the CPUC’s mission to attempt to prevent any customers (program participants) from receiving incentives for projects or savings that would have occurred otherwise. To attempt to prevent free ridership through project-by-project review is to turn energy efficiency incentive programs into interrogations of its participants – hardly a means of encouraging participation. To continue to investigate participation in such a way is an inefficient waste of the ratepayer’s money, and the CPUC’s limited resources.

We believe that the activities of encouraging energy efficiency and program participation, and determining program impacts needs to again be separated. When these activities are separated, it is important to assess the program-level impacts and IOU savings credit, not to attempt to prevent individual customers from ever participating as free riders.

Thanks again for the opportunity to provide our input on this important issue.